Osama M. Alian
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Education

Michigan State University, East Lansing, MI

- PhD - Microbiology and Molecular Genetics

Wayne State University, Detroit, MI

- B.A. Art History, Wayne State University, Detroit, MI
- B.A. Biological Sciences, Wayne State University, Detroit, MI

Relevant Experience

Postdoctoral Fellow 2024 - Present

Origins and Habitability Lab - NASA Jet Propulsion Laboratory / Caltech, Pasadena, CA

- Executing and managing an interdisciplinary research project simulating hydrothermal vent under high pressure and temperature, their chemistry and environmental context for the study of prebiotic chemistry and the origin of life.
- Developed protocols and standard procedures for instruments and high-pressure reactors that included prototyping, calibrating and optimizing their operation.
- Mentored interns and graduate students in respective projects that involve benchtop experiments, data acquisition, analysis, interpretation and reporting with an emphasis on manuscript writing and submission to peer-reviewed journals.

Graduate Research Assistant - Doctoral Candidate 2017 – 2024

Schrenk Lab, Department of Microbiology and Molecular Genetics - Michigan State University

- Managed independently a highly collaborative research project involving ocean field sampling and analysis.
- Deployed bioinformatics tools for the study of Lost City hydrothermal vent system microbial community ecology and function through 16S rRNA analysis and metagenomic sequencing.
- Applied an array of culturing methods for culturing microbes from deep sea plume samples as well as continental serpentinite hosted systems.
- Adapted an analytical pipeline for co-registered analysis of the microhabitats within preserved fragile Lost City hydrothermal vent carbonates as well as Guaymas Basin black smoker sulfides using confocal fluorescent imaging, Raman spectroscopy and laser ablation ICP-MS.
- Established new lab standard methods and protocols for employing analytical pipelines across differing environments and sample types.

Graduate Research Assistant January 2021 – April 2021

COVID-19 Surveillance and Early Detection Lab (Spartan Spit) - Michigan State University

- Processed thousands of submitted saliva samples for COVID-19 PCR community testing as part of a public health surveillance initiative across the MSU campus as well as participating partners.

Graduate Research Assistant (Unpaid) – Master's Candidate August 2016 – August 2017

Chung Lab, Department of Physiology - Wayne State University School of Medicine

- Developed and implemented protocols for investigating heart failure with preserved ejection fraction or HFpEF, in a murine animal model, including surgical procedures carried out under approved IACUC procedures for collection of viable cardiac tissue.

- Investigated underlying causes of cardiac cell contractility and stiffness through microscopic and molecular techniques including cellular calcium levels, contractile force, and relevant protein content.

Research Assistant August 2015 – August 2016

Ram Lab, Department of Physiology - Wayne State University School of Medicine

- Implemented and optimized engineering protocols for a prototype ballast water treatment verification system capable of testing for presence of live biology in ship ballast water systems in accordance with IMO standards.
- Created and deployed testing protocols for verifying function of the system in the field such as in the Detroit River as well as on ship ballast and within Detroit wastewater treatment plants.
- Developed and implemented protocols for culturing algae and other freshwater microfauna as controls for the study of biological detection at different size ranges.
- Trained and supervised multidisciplinary undergraduate and graduate students.

Educator April 2014 – January 2016

Michigan Science Center

- Interacted with visitors, providing scientific information and guidance in exhibits and demonstrations.
- Taught interactive programs in various scientific topics for visiting school groups.
- Actively engaged in outreach activities serving as both educational events as well as marketing for the center.
- Development of new lessons, demonstrations, and programs focusing on STEM outreach and school curriculum enhancement.
- Development of science programs to expose students to high level scientific research and university environments in partnership with teachers and university faculty.

Field and Analog Research Experience

R/V Roger Revelle RR2107 Science Crew, Guaymas Basin, Pacific Ocean November – December 2021

- Collection of core sediment, fluid, and sulfide vent samples from the Guaymas Basin.
- Deployment, operation and recovery of sophisticated oceanographic instruments for chemical measurements and collections (AUV Sentry, ROV Jason and proprietary samplers).

R/V Atlantis Expedition AT42-01 Science Crew, Lost City, Atlantic Ocean September – October 2018

- Collected fluid and carbonate chimney samples as part of an interdisciplinary science team.
- Carried out shipboard microbiological cultivation and stable isotope experiments.
- Participated in deployment, operations, and recovery for scientific hardware, instruments and ROV.

Coast Range Ophiolite - Lower Lake, CA July 2018

- Collected fluid and rock samples for microbiological and biochemical analyses from drilled observation wells within a serpentinite hosted system.

Awards and Fellowships

- NASA Mars Exploration Program Travel Award for AbSciCon 2022
- International Astrobiology Summer School Travel Award 2021, 2022
- MSU College of Natural Science Dissertation Continuation Fellowship 2020, 2021
- Russell DuVall Endowed Scholarship Award 2020
- Europa Clipper In-Situ Science and Instrumentation Workshop Travel Award 2020
- MSU College of Natural Science Fellowship Award 2020
- NASA Michigan Space Grant Consortium Graduate Fellowship 2019
- Astrobiology Graduate Conference Funding and Travel Award 2019

- Microbial Single Cell Genomics Workshop Travel Funding 2019
- CDEBI Metagenomics Workshop Funding and Travel Award 2018

Presentations, Posters and Talks

1. **Osama M. Alian**, "Life in a Spatial Context", *Network for Life Detection Forum* (**2023)**
2. **Osama M. Alian**, Rachel L. Harris, Peter R. Girguis, Matthew O. Schrenk, "Bulk measurements and microscale heterogeneity: Reconciling differences for the detection of agnostic biosignatures", *American Geophysical Union Conference,* Poster Presentation **(2022)**
3. **Osama M. Alian**, "Life in a spatial context: examining extremophile microbe organization in deep ocean hydrothermal vents", *NASA Astrobiology Science Conference* **(2022)**
4. **Osama M. Alian**, William J. Brazelton, Karmina A. Aquino, Susan Q. Lang, Matthew O. Schrenk "Fine Scale Heterogeneity Drives Differentiation of Hydrothermal Chimney Microbial Populations", *NASA Astrobiology Science Conference,* Poster Presentation, **(2022)**
5. **Osama M. Alian**, "The Edge of Habitability: Understanding the Energy Dynamics of the Deep Sea Lost City Hydrothermal Vents", Biomolecular Sciences Seminar, *Michigan State University* **(2019)**
6. **Osama M. Alian,** Matthew Schrenk "Modeling Habitability at the Rock-Water Interface", *Astrobiology Graduate Conference*, Poster Presentation (**2019**)
7. **Osama M. Alian,** Dylan Mankel, Miranda Pryde, Matthew Schrenk, "Simulating Redox Gradients in an Early Earth Analog: Microenvironmental Implications for Microbial Habitability"*, Astrobiology Science Conference*, Poster Presentation and Lightning Talk (**2019**)
8. **Osama M. Alian** "From the Ocean Depths to Deep Space", *TEDxMSU,* Featured Speaker (**2019**)
9. **Osama M. Alian**, Hager Alkhafaji, Hannah Fine, Adrian Vasquez, Banani Sen, Jeffrey Ram, "Automatic Measurement of Enzymatic Activity for Monitoring Live Organisms in Ballast Water", *International Association of Great Lakes Research (IAGLR) Conference*, Oral Presentation (**2016**)

Peer Reviewed Publications

1. **Osama M. Alian**, William J. Brazelton, Karmina Aquino, Katrina I. Twing, Lizethe Pendleton, Gretchen Früh-Green, Susan Q. Lang, Matthew O. Schrenk. "*Habitat mineral heterogeneity associated with microbial community differentiation in vent chimneys of the Lost City Hydrothermal Field", Frontiers in Microbiomes (**Accepted 2024**)*
2. Joseph R. Patterson, Allyson Cole-Strauss, Nathan Kuhn, Carlene Mercier, Joseph Kochmanski, John A. Gerlach, Rhiannon M. LeVeque, Kerri A. Neugebauer, Kayla N. Conner, Jasper Gomez, Mark G. Hennes, Kaje'ne E. Thompson, Destinee L. Rytlewski, Chloe C. Bigwood, Amy Scharmen, Gabriel Simjanovski, Cassidy Riley, Jessica Donaldson, Dilann Yasin, Najwa Kouja, Zaria Contejean, Michaela Burnett, Shakhlo Aminova, Nat Ato Yawson, Simran B. Singh, **Osama M. Alian**, Carson D. Broeker, Erin K Zaluzec, Morgan ONeill, Burgit Puschner, Aron Sousa, Laura Bix, Brian Jesperson, Claudia Holzman, Jade Mitchell, Ryan Julien, Yesim Askin, Danielle Barnes, Purna Durshanpalli, Doug Krum, Rett Weber, Morgan Patterson, Becky Anderson, Ryan Hunt, Benjamin O'Brien, Andrew Umstead, John S. Beck, Irving E. Vega, Caryl E. Sortwell, Jack W. Lipton, "*Large-Scale SARS-CoV-2 Testing Utilizing Saliva and Transposition Sample Pooling", Journal of Visualized Experiments (**2022)***
3. Tony Z. Jia, Kristin N. Johnson-Finn, **Osama M. Alian**, Irene Bonati, Kosuke Fujishima, Natalie Grefenstette, Thilina Heenatigala, Yamei Li, Natsumi Noda, Peter I. Penev, Paula Prondzinsky, Harrison B. Smith, "*AbGradCon 2021: Lessons in Digital Meetings, International Collaboration, and Interdisciplinarity in Astrobiology*", *International Journal of Astrobiology (**2022)***
4. Danielle J. Whittaker, Samuel P. Slowinski, Jonathan M. Greenberg, **Osama M. Alian**, Andrew D. Winters, Madison M. Ahmad, Mikayla J. E. Burrell, Helena A. Soini, Milos V. Novotny, Ellen D. Ketterson, Kevin R. Theis, "*Experimental Evidence that Symbiotic Bacteria Produce Chemical Cues in a Songbird*", *Journal of Experimental Biology (**2019**)*

5. **Osama M. Alian**, Shadan Ali, Ramzi M. Mohammad, Asfar S. Azmi, Fazlul H. Sarkar, "Chapter 15-Prioritizing Diagnostic, Prognostic, and Therapeutic MicroRNAs in Pancreatic Cancer: Systems and Network Biology Approaches", *Molecular Diagnostics and Treatment of Pancreatic Cancer - Systems and Network Biology Approaches (**2014**)*
6. **Osama M. Alian**, Ramzi M. Mohammad, Asfar S. Azmi. "Systems Biology Approaches to Pancreatic Cancer Detection, Prevention and Treatment" *Current Pharmaceutical Design (**2014**)*
7. **Osama M. Alian**, Asfar Azmi, and Ramzi M. Mohammad, "Network Insights on Oxaliplatin Anti-Cancer Mechanisms", *Clinical and Translational Medicine,* (***2012***)
8. **Osama M. Alian**, Ramzi M. Mohammad, "Network Pharmacology: Reigning in Drug Attrition", *Current Drug Discovery Technologies (**2012**)*

Teaching and Mentorship Experience

Graduate Teaching Assistant

- Oceanography (GLG 303) 2022
- Introduction to Immunology (MMG 451) 2021
- Eukaryotic Cell Biology (MMG 409) 2020
- Introductory Microbiology Lab (MMG 302) 2019-2022
- Advanced Microbiological Techniques (MMG 408) 2019

Non-Academic Activities

- ***Ocean Exploration Trust* –** Scientist Ashore Program Member 2021 – Present
- ***NASA HERA Mission 21* –** Commander 2020
- ***Astrobiology Graduate Conference* -** Organizing Committee Member 2019 – 2021
- ***TEDxMSU* - Speaker** 2019
- ***University Rover Challenge, Mars Desert Research Station* -** Staff / Judge 2019 – Present
- ***Sciworthy* -** Managing Editor 2017 – 2022
- ***FIRST LEGO League Michigan* -** Judge 2014 – 2017
- ***Michigan Science Center* -** Volunteer 2013 – 2018